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# Special Features of Nuclear Reactions Induced by Loosely Bound Nuclei

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Reactions involving loosely bound nuclei and occurring at energies in the vicinity of the Coulomb barrier height have many special features that have vigorously been discussed in recent years in a number of studies (see, for example, [1, 2]). These features include the the enhancement of interaction cross sections in the sub-barrier energy region. This effect is
especially pronounced for clustering nuclei (for example, 6,7,9Li) [3], as well as neutron-halo nuclei (for example, 6He) [4]. Transfer, breakup, and complete fusion reactions are dominant interaction channels for such nuclei. Processes in which the breakup of loosely bound nuclei in the field of a heavy nucleus is followed by the fusion of the residual nucleus with the target
nucleus have been the subject of numerous theoretical and experimental investigations.
Excitation functions are measured for complete-fusion and transfer reactions induced by the
interaction of d, 6,8He and 6,9Li with 206Pb, 209Bi, and Pt. Data obtained for fusion reactions induced by 6,8He ions deviate from the predictions of the statistical model of compound-nucleus decay at projectile energies in the vicinity of the Coulomb barrier height. A strong enhancement of cross sections for fusion reactions induced by the interaction of 6,8He with target nuclei is observed. The cross sections for reactions of cluster transfer, neutron transfer from 3, 6, 8He, and deuteron transfer from 6,9Li at deep-subbarrier energies are also found to be enhanced. These results are discussed from the point of view of the effect of the cluster structure of nuclei on the interaction probability at energies in the vicinity of the Coulomb barrier height.
We are going to measure total reaction cross sections and cross sections for cluster-transfer
reactions in the subbarrier energy region.
The results of the present study are of paramount importance for solving astrophysical problems—in particular, for obtaining deeper insight into the mechanism of the production of light elements in the Universe.

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